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ABSTRACT

The central purpose of this study was to assess the level of mastery of Florida secondary students enrolled in fundamentals of agribusiness and natural resources occupations programs during the 1982-83 school year. In addition, the study sought to (1) determine level of mastery on the Fundamentals of Agribusiness Occupations Achievement Test (FAOAT); (2) compare students' levels of mastery on the FAOAT according to selected demographic variables; (3) determine which recommended competencies are in fact being taught by teachers; and (4) determine the percentage of time devoted to the six major content areas in the fundamentals program. Data were collected from 2,011 students and 54 teachers of agriculture in 50 secondary schools. The study found that students' mean level of mastery on the 60-item FAOAT was slightly more than 57 percent, with students performing best on questions related to agribusiness management and plant science and poorest on agricultural mechanics questions. The study also found that students taking the FAOAT who were currently members of Future Farmers of America (FFA) had significantly higher scores than students who were not in FFA, as did students who were in supervised occupational experiences. In addition, college-bound students, students with plans to enter agricultural occupations or the military, or those who had no plans scored higher than students who planned to enter a non-agricultural career field. Almost 70 percent of the 76 competencies listed as fundamental were taught by 50 percent or more of the teachers responding to the survey. All of the competencies in the leadership area were taught by 75 percent or more of the teachers, while only 2 of the 16 competencies in the agricultural mechanics content area were taught by 75 percent or more of the teachers. The study recommended strengthening the agricultural mechanics component of the programs and encouraging students to join FFA and become involved with supervised occupational experiences. (The FOAOT and related materials make up about half the document.) (KC)

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ASSESSMENT OF COMPETENCIES POSSESSED BY STUDENTS ENROLLED IN THE FUNDAMENTALS OF AGRIBUSINESS AND NATURAL RESOURCES OCCUPATIONS PROGRAM

A Report of Research

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INTRODUCTION

A review of the Vocational Education Amendments of 1976 (American Vocational Journal, 1976) makes it clear that writers of that legislation expect evaluations of vocational education programs to yield data and information useful in formulating ongoing and future policy program decisions. However, after careful review of a report to the Governor of Florida, (Governor's Commission on Secondary Schools, 1983) it is obvious that sufficient data regarding the effectiveness of vocational education is not available, thus lending support for the need to investigate this area.

One commonly used measure of the effectiveness of a curriculum is the performance of students. The assessment of student mastery of skills and knowledge may also be a measure of teacher effectiveness. Three purposes have been identified for student evaluation by Calhoun & Finch (1976): (1) to determine readiness to advance to next learning level, (2) to diagnose student's level of achievement for purposes of proper placement at onset of instruction and for determining deficiencies in learning and (3) to provide individual guidance. Thus, tests provide a measure of how much is being learned in an instructional program and how well the objectives are being mastered. In order to properly use student tests as a measure of program effectiveness, a set of measurable objectives must be developed.

These objectives are or should be based upon competencies that industry recognizes as necessary for employment. Consequently, one measure of program effectiveness is the extent to which students completing or leaving an instructional program possess or fail to possess the competencies specified in the instructional objectives. Therefore, test information can not only be used to evaluate program effectiveness, but can also be used to evaluate the students' mastery of instructional objectives as an aid to placing students in appropriate employment or in additional instructional situations (Glasser and Nitko, 1971). Instruments or tests made up of items keyed to a set of specific measurable objectives are termed criterion-referenced tests (Ivens, 1970).

In order to have valid criterion-referenced measures (tests) of the competencies possessed by students enrolled in agribusiness and natural resources education programs in Florida, McGhee and Cheek (1983) conducted a project to develop such an instrument. As a result of their activities, test item banks were developed for the major content areas of the Fundamentals of Agribusiness and Natural Resources Occupations, (hereafter referred to as Fundamentals). Selected items from the banks, relative to the Fundamentals program were used in the present project to assess student mastery of competencies in the program.

PURPOSE

The central purpose of this study was to assess the level of mastery of the students enrolled in the Fundamentals program during the 1982-1983 school year. In order to achieve this purpose, the following objectives were developed as guidelines for conducting the research:

1. Determine the level of mastery of currently enrolled vocational agriculture students on the Fundamentals of Agribusiness Occupations Achievement Test (FAOAT).

2. Compare students' level of mastery on the Fundamentals of Agribusiness Occupations Achievement Test (FAOAT) according to the following:

   A. Current Grade in School.
   B. Previous Enrollment in Agriculture Classes.
   C. FFA Membership.
   D. Involvement in Supervised Occupational Experience Program.
   E. Career Plans.

3. Determine whether or not competencies identified in the Curriculum Guide For Fundamentals Of Agricultural Occupations (1980) are being taught by teachers in the schools.

4. Determine the percentage of time, as indicated by teachers, devoted to each of the major content areas recommended for inclusion in the Fundamentals program.

RESEARCH PROCEDURE

Reported herein are the research procedures employed to accomplish the major purpose and objectives of the study. For clarity, this summary has been divided into the following sections: (1) population; (2) instrumentation; (3) data collection procedures; and (4) statistical analysis.

Population

The population for the study was students enrolled in the Fundamentals of Agribusiness and Natural Resources Occupations program (DOE #3710) during the 1982-1983 school year.

In order to determine the teachers and/or schools teaching or offering the Fundamentals program, each of the five Department of Education regional consultants for agribusiness and natural resources education was contacted and asked to identify the Fundamentals programs and teachers in their region. This resulted in a list of 190 teachers who were offering the Fundamentals program. Subsequently, a letter (Appendix A) was sent to each of the identified teachers requesting verification of their participation in the program and their willingness to administer a test to students near the end of the school year. This letter, and a follow-up letter (Appendix B), resulted in returns from 57 teachers who indicated they would be willing to participate and could administer the tests to their students enrolled in the Fundamentals of

Agribusiness and Natural Resources Occupations program. Responses from the teachers indicated that there were approximately 2250 students to whom the test might be administered.

Instrument Development

In order to accomplish objective one, which was to assess the mastery level of students enrolled in the Fundamentals program, a sixty-item objective test (Appendix C) was developed. Test questions covered competencies identified in the Curriculum Guide for Fundamentals of Agriculture Occupations (1980) for each of the six major content areas contained in the Fundamentals program. The number of questions covering each content area was proportional to the recommended percentage of time that should be allocated to instruction in each of these content area. These percentages and the subsequent number of questions are described in Table 1.

TABLE 1

Recommended Percent of Fundamental Instruction by Content Area and Subsequent Number of Questions On the FAOAT

Content Area	Percent of Total Hours	Number of Test Questions	Percent of Test Questions
Agribusiness Management	12	7	11.6
Animal Science	18	11	18.3
Plant Science	18	11	18.3
Soil Science	15	9	15.0
Agricultural Mechanics	25	15	25.0
Leadership	12	7	11.7
TOTAL	100	60	100.0

Test questions were selected from those available for each major content area in the item banks developed previously (McGhee and Cheek, 1983). Based upon recommendations of the Office of Instructional Resources, University of Florida, items were selected using the following criteria:

1. Item discrimination index greater than 0.30 which indicates that the item discriminates between students who generally do poorly on the test from those who do better.

2. Item difficulty between .50 and .80 which is a measure of the proportion of students who will, in general, answer the item correctly.

Table 2 reveals the mean item discrimination indices and item difficulties for test questions included in FAOAT according to major content area.

TABLE 2

Mean Item Discrimination and Item Difficulty
for FAOAT According to Major Content Area

Content Area	Mean Item Difficulty*	Mean Item Discrimination*
Agribusiness Management	0.62	0.54
Animal Science	0.60	0.69
Plant Science	0.58	0.66
Soil Science	0.62	0.40
Agricultural Mechanics	0.49	0.48
Leadership	0.72	0.55

* Based upon item analysis (McGhee & Cheek, 1983).

In addition to the sixty test items designed to assess performance in Fundamentals of Agribusiness and Natural Resource Occupations, five additional items sought information concerning the student's grade in school, FFA membership, previous agriculture class experience, supervised occupational experience program, and career plans.

A teacher questionnaire (Appendix F) was developed to gather data necessary to accomplish objectives 2 and 3. The questionnaire consisted of two parts. Part I was designed to determine the percentage of time spent at the teacher's school on topics related to the six major Fundamentals content areas (agribusiness management, agricultural mechanics, leadership, plant science, animal science and soil science). Part II asked the teacher to indicate whether or not each of the 76 competencies identified in the Curriculum Guide for Fundamentals of Agricultural Occupations (1980) for the Fundamentals of Agricultural Occupations program was included in their Fundamentals program.

Data Collection

Data for this study were collected during the period April 12 through June 10, 1983. Fifty-seven teachers who indicated a willingness to participate in this project were sent a letter (Appendix G) alerting them that a packet was forthcoming. The packet contained a cover letter (Appendix H), a sufficient number of student tests (Appendix C) and answer sheets, and a teacher questionnaire (Appendix F). The teachers were encouraged to return the completed answer sheets by May 15, 1983. Those doing so received a letter of appreciation (Appendix J) and a printout of their students performance on the test. A follow-up letter (Appendix I) was mailed on May 16 to teachers who had not responded. By June 1, 1983, 54 teachers had returned the teacher questionnaires and 2011 student completed answer sheets. The three remaining non-responding teachers were contacted by telephone to encourage return of completed items. These efforts resulted in a total return of 54 teacher questionnaires (94.7 percent) and 2011 student answer sheets.

Data Analysis

Data were transferred from scan sheets to tape by the University of Florida data processing center. To analyze data related to objectives one and two, total mean scores were computed for the sixty-item Fundamentals of Agribusiness Occupations Achievement Test (FAOAT). Descriptive statistics were also utilized to summarize each of the five demographic variables in objective two. One way analysis of variance was used for students' mean scores on the FAOAT when considering grade in school or career plans. The t-test was also used in objective two to determine whether differences existed in students mean scores on the FAOAT with respect to current grade in school, FFA membership, previous enrollment in agriculture classes or involvement in supervised occupational experience programs. Descriptive statistics were used to summarize and analyze the data in objectives three and four.

FINDINGS

Objective One

Objective one was designed to determine the mastery level (achievement) of currently enrolled vocational agriculture students on the Fundamentals of Agribusiness Occupations Achievement Test (FAOAT).

As shown by data in Table 3, the mean score of the 2011 students who were administered the sixty-item FAOAT was 34.23 (57.05 percent). The standard deviation was 9.79 which indicates that approximately two-thirds, or 68 percent, of the students mean scores were between 24.4 and 44.0.

TABLE 3

Achievement of Students on the FAOAT

n = 2011

Mean Raw Score*	S. D.	Percentage Score
34.23	9.79	57.05

* Range: 3-57

The Fundamentals of Agribusiness Occupations Achievement Test (FAOAT) was composed of questions in six major content areas: animal science, agricultural mechanics, leadership, plant science, agribusiness management, and soil science. Data in Table 4 revealed that the mean percentage score of students for questions in each content area ranged from a low of 50.6 percent for agricultural mechanics to a high score of 68.1 percent in agribusiness management. Plant science and animal science questions were second and third in ranking in terms of percentage of questions correctly answered with 62.3 percent and 59.4 percent respectively. The fourth and fifth highest percent scores were in the areas of leadership (54.7 percent) and soil science (54.2 percent).

TABLE 4

Achievement of Students on FAOAT on Questions Related to Major Content Areas of Fundamentals Program

n = 2011

Content Area	No. of Test Questions	Mean Raw Score	SD	Percent Score
Animal Science	11	6.53	2.25	59.4
Agricultural Mechanics	15	7.60	2.61	50.6
Leadership	9	4.93	2.00	54.7
Plant Science	9	5.61	2.09	62.3
Agribusiness Management	7	4.77	1.94	68.1
Soil Science	9	4.88	2.06	54.2

Objective Two

As a second objective the researchers sought to compare students' level of mastery on the FAOAT according to five variables: (1) Current Grade in School; (2) Previous Enrollment in Agriculture Classes; (3) FFA Membership; (4) Involvement in Supervised Occupational Experience Program; and, (5) Career Plans.

Current Grade in School

Students completing the FAOAT were asked to indicate their current grade in school. Data in Table 5 reveals that the vast majority (69.15 percent) of the students were in the ninth grade while 13.7 percent were in the 10th grade. Less than 10 percent of the students were in each of the other grades (8th, 11th and 12th grade).

TABLE 5

Current Grade in School of Students Completing the Fundamentals of Agribusiness Occupations Achievement Test (FAOAT)

n = 1935

Grade in School	Number	Percent
8th	89	4.59
9th	1338	69.15
10th	265	13.70
11th	157	8.11
12th	86	4.45
TOTAL	1935	100.00

The total mean scores and standard deviations for the various grade in school categories of students taking the FAOAT are presented in Table 6. The scores ranged from a high of 36.69 for students in the 12th grade to a low of 25.95 for those in the 8th grade.

TABLE 6

Mean Score on FAOAT According to Grade in School

n = 1935

Current Grade in School	Number	Mean Score	Standard Deviation
8th	89	25.95	8.56
9th	1338	35.06	9.02
10th	265	33.85	8.34
11th	157	34.49	8.76
12th	86	36.69	9.10

A one-way analysis of variance was computed to determine if there were significant differences among the various grade level mean scores on the FAOAT. The analysis of variance (Table 7) resulted in an F value of 20.91, which was significant at the .0001 level.

Duncan's Multiple Range Test was used to compare the mean scores for the five grade level categories.

Duncan's procedure indicates that the mean FAOAT scores (Table 6) of students enrolled in 12th grade were significantly higher than students enrolled in either 8th or 10th grade. Likewise, students in the 9th, 10th and 11th grades scored significantly higher on the FAOAT than students in the 8th grade.

TABLE 7

Analysis of Variance: Mean FAOAT Scores
According to Current Grade In School

n = 1935

Source	Sum of Squares	df	Mean Square	F
Between Groups	7450.01	4	1862.50	20.91*
Within Groups	171875.72	1930	89.05	
Total	179325.73	1934		

* P <.0001

Previous Enrollment in Agriculture

In response to the question of whether they had ever been in an agriculture class before the current year, 47.5 percent of the students indicated that they had previously been in an agriculture class while 52.5 percent indicated that they had not been enrolled. The t-test was used to determine whether significant differences existed between the mean scores for the two groups of students on the FAOAT with the .05 level of significance as the critical standard. Results in Table 8 reveal that there was no significant difference between students who had and students who had not previously been enrolled in an agriculture class. The mean score for previously enrolled students was 35.39 which was just slightly greater than the score of 34.72 for students who had not previously been enrolled in an agriculture class.

TABLE 8

Mean Score on FAOAT According to Previous Enrollment in Agriculture

n = 1861

	Number	Mean Score	SD	t	Probability
Previously Enrolled in Agriculture	884	35.39	9.05	1.55	0.12
Not Enrolled Previously	977	34.72	9.52		

Membership in FFA

Students completing the FAOAT indicated that 57.7 percent of them were currently members of their schools FFA chapter, while 42.3 percent were not. To determine whether there were significant differences between students' performance on the FAOAT and their membership in FFA, the t-test with a .05 level of significance as the critical standard was used. As illustrated in Table 9, students who were FFA members scored significantly higher (36.89) on the FAOAT than students who were not FFA members (32.49).

TABLE 9

Mean Score on FAOAT According to FFA Membership

n = 1865

Group	Number	Mean Score	SD	t	Probability
FFA Member	1076	36.89	8.95	10.38	0.0001
Not FFA Member	789	32.49	9.11		

SOEP Existence

Students were asked if they had a supervised occupational experience program (SOEP), such as raising a steer, growing a garden, or working at an agricultural job. Almost two-thirds (61.9 percent) of those responding indicated that they did have an SOEP while 38.1 percent indicated that they did not. The t-test was used to determine if students with an SOEP had significantly different mean scores on the FAOAT than students having no SOEP. A .05 level of significance was used as the critical standard. Results in Table 10 indicate that students with an SOEP had mean scores significantly higher (35.87) than students who indicated they did not have an SOEP (33.75).

TABLE 10

Mean Score on FAOAT According to Whether Student Has SOE Program

n = 1845

Group	Number	Mean Score	SD	t	Probability
Has SOEP	1143	35.87	9.03	4.71	0.0001
No SOEP	702	33.75	9.63		

Career Plans

Students were also asked to indicate their career plans after high school graduation. Results in Table 11 suggest that the students who planned to attend college and students who were unsure of future plans, comprised the largest proportion (30.40 and 30.35 percent, respectively) of the respondents. Only 14.03 percent of the students indicated an interest in an agricultural occupation. The military was indicated by 15.41 percent of the students as being in their future career plans. The smallest proportion (9.81 percent) of the students indicated that they planned to work in a non-agricultural occupation.

The total mean scores and standard deviations for the various categories of career plans of students completing the FAOAT are presented in Table 12. The scores ranged from a high of 36.83 for students planning to attend college to 30.08 for individuals planning on entering a non-agricultural occupation.

TABLE 11

Career Plans After Graduation of Students Completing the FAOAT

n = 1865

Career Plan	Number	Percent
Ag Occupation	266	14.03
Non-Ag Occupation	186	9.81
College/Post High School Education	576	30.40
Military	292	15.41
Don't Know	575	30.35
TOTAL	1865	100.00

A one-way analysis of variance was computed to determine if there were significant differences among mean scores on the FAOAT, for the various categories of career plans. The analysis of variance (Table 12) resulted in an F value of 20.26, which was significant at the .0001 level.

Duncan's Multiple Range Procedure was used to compare the mean scores for the five categories of career plans.

The results of Duncan's test suggest that the mean FAOAT scores of students who planned to attend college were significantly higher than the scores of students in the other categories. Likewise, students with plans to enter an agricultural occupation, the military or who did not know their plans, scored significantly higher on the FAOAT than students planning to enter a non-agriculture occupation.

TABLE 12

Analysis of Variance: Mean FAOAT Score
According to Career Plans

n = 1895

Source	Sum of Squares	df	Mean Square	F
Between Groups	7139.36	4	1784.84	20.06*
Within Groups	168153.89	1890	88.97	
Total	175293.25			

* P <.0001

TABLE 13

Mean Score on FAOAT According to Career Plans

n = 1895

Career Plans	Number	Mean Score
College/Post High School	576	36.82
Ag. Occupation	266	34.49
Military	292	34.49
Non-Ag Occupation	186	30.08
Don't Know	575	30.08

Objective 3

As a third objective the researchers sought to determine whether or not competencies identified in the Curriculum Guide for Fundamentals of Agricultural Occupations (1980) were being taught by teachers participating in this study. Seventy-six competencies were identified in the curriculum guide. Appendix I contains data which reveal the number and percentage of respondents indicating whether or not each competency was included in their Fundamentals teaching program.

Data in Table 14 indicate the degree to which the 76 competencies included in the Curriculum Guide for Fundamentals of Agriculture Occupations (1980) were being taught by the teacher respondents in this study. The data reveal that 34 (44.7 percent) of the competencies were taught by 75 - 100 percent of the teachers. Nineteen competencies (25 percent) were taught by 50 to 75 percent of the teachers. Twenty competencies (26.3 percent) were included in the programs of 25 - 50 percent of the teachers. Only three (4 percent) of the 76 competencies were taught by 0 - 25 percent of the teacher respondents.

TABLE 14

Degree to Which Fundamental Competencies Are Being Taught by Teachers

n = 54

Percent of Teachers	Number of Competencies	Percent
0 - 24.9	3	4.0
25 - 29.9	20	26.3
30 - 74.9	19	25.0
75 - 100	34	44.7
Total	76	100.0

Table 15 presents 34 competencies identified by over 75 percent of the respondents as being included in their Fundamentals of Agricultural Occupations program. The table reveals that the competencies identified by over 75 percent of the teachers as being included in their Fundamentals program came from each of the six major content areas. The largest number of competencies were in the area of plant science (10) and the smallest number were related to agricultural mechanics (2). The other content areas of animal science, soil science, leadership, and agribusiness management accounted for 7, 6, 5, and 4 competencies, respectively.

TABLE 15

Competencies Identified by Over 75 Percent of Teachers As Being Actually Taught in Fundamentals of Agribusiness and Natural Resources Education Program

Competency	Percent Teaching Competency
Animal Science	
The student will be able to identify the different breeds of beef cattle	90.7
The student will be able to define the terminology related to the beef industry	86.8
The student will be able to identify the different breeds of dairy cattle	75.9
The student will be able to define common terminology associated with the dairy industry	75.5
The student will be able to identify the major breeds of swine	85.2
The student will be able to define common terminology related to the swine industry	83.3
The student will be able to list possible careers in animal science	88.5

Table 15 (continued)

Competency	Percent Teaching Competency
Agricultural Mechanics	
The student will be able to utilize safety practices in the shop	87.0
The student will be able to identify basic tools	83.3
Leadership	
The student will be able to determine what the FFA represents	96.3
The student will be able to explain the history of the FFA	96.3
The student will be able to understand the different degrees of membership	96.3
The student will be able to determine types of programs offered by the FFA	94.4
The student will learn elementary parliamentary procedure practices	92.6

Table 15 (continued)

Competency	Percent Teaching Competency
Plant Science	
The student will be able to identify plants by their life cycles	90.7
The student will be able to identify plants by their use	87.0
The student will be able to determine the form and basic structure of a plant	90.7
The student will be able to determine the parts of a plant	94.4
The student will be able to identify plant nutrients	90.7
The student will be able to describe plant reproduction	87.0
The student will be able to describe the germination of a seed	87.0
The student will be able to describe the methods associated with planting and transplanting	90.7
The student will be able to list possible careers in plant science and forestry	96.3
The student will learn the importance of forestry	85.2

Table 15 (continued)

Competency	Percent Teaching Competency
Agribusiness Management	
The student will be able to identify an agribusiness	90.7
The student will demonstrate the ability to keep accurate business records	81.5
The student will develop knowledge of Agribusiness careers	90.7
The student will be able to determine supervised occupational work experiences	88.9
Soil Science	
The student will be able to describe how soil is formed	81.5
The student will be able to describe different soil colors	79.6
The student will be able to identify the components of soil	83.0
The student will be able to define components of productive soil	79.6

Table 15 (continued)

Competency	Percent Teaching Competency
The student will be able to explain the need for conserving natural resources	83.3
The student will be able to identify major fertilizer elements	92.6

The number of competencies identified by over 75 percent of the teachers as being included in their programs were compared with the total number of competencies identified in the teacher questionnaire. Data in Table 16 suggests that 100 percent of the competencies in the area of leadership were identified by over 75 percent of the teachers as being included in their program. Soil science had the second highest proportion (66.7 percent) of competencies being taught by over 75 percent of the teachers. Slightly over one-half of the 18 plant science competencies (55.5 percent) and 57.1 percent of the 7 agribusiness management competencies were indicated by the teachers as being included in their program. Little more than one third of 19 animal science competencies (36.8 percent) and only 12.5 percent of the agricultural mechanics competencies were being taught by 75 percent or more of the 54 teachers responding to this study.

TABLE 16

Percentage Of Competencies* By Content Area Identified By More Than 75 Percent of Teachers As Being Included In Fundamentals Program

n = 54

Content Area	Total Number of Competencies	Number of Competencies Identified by 75%	Percent
Animal Science	19	7	36.8
Agricultural Mechanics	16	2	12.5
Leadership	5	5	100.0
Plant Science	18	10	55.5
Agribusiness Management	7	4	57.1
Soil Science	9	6	66.7

* Identified in Curriculum Guide for Fundamentals of Agricultural Occupations, State of Florida, 1980.

Objective Four

A final objective of the researchers was to determine the percentage of time devoted to each of the major content areas recommended for the Fundamentals program. Teachers were asked to estimate the percentage of time spent teaching topics related to animal science, agricultural mechanics, leadership, plant science, agricultural business management, and soil science. They also indicated a percentage of time spent on miscellaneous topics and activities.

As the data in Table 17 reveal, the content areas of plant science and animal science were quite similar in mean time, spent by the 54 responding teachers with 21.8 percent and 21.4 percent, respectively. Teaching related to leadership topics consumed 15.5 percent of the time. Agricultural mechanics

content consumed 12.8 percent of the school year and soil science and agricultural business management topics consumed 10.7 and 7.5 percent of the time, respectively. Miscellaneous topics used 10.3 percent of the time.

The data also revealed differences between the percentage time recommended for the various content areas and the actual estimate of time as perceived by the teacher respondents. The greatest difference (-12.2 percent) was between recommended time for the agricultural mechanics component (25 percent) and the teacher estimate of actual time spent (12.8 percent). All other differences were between 4.5 - 10.3 percent.

TABLE 17

Comparison of Recommended Percentage and Teacher Estimate of Total Percentage of School Year Devoted to Major Content Areas in Fundamentals Program

n = 54

Content Area	Recommended Percentage*	Actual Teacher Estimate	SD	Difference in Percentage
Animal Science	18	21.4	11.7	3.4
Agricultural Mechanics	25	12.8	11.2	-12.2
Leadership	12	15.5	9.3	3.5
Plant Science	18	21.8	13.9	3.8
Agribusiness Management	12	7.5	5.3	-4.5
Soil Science	15	10.7	6.8	-4.3
Miscellaneous	0	10.3	9.0	10.3
TOTAL	100	100.0		

* Source: Curriculum Guide for Fundamentals of Agricultural Occupations, State of Florida, 1980.

CONCLUSIONS

The central purpose of this study was to assess the level of mastery of students enrolled in the Fundamentals of Agribusiness and Natural Resources Occupations Program during the 1982-83 school year. In addition, this study sought to (1) determine level of mastery on the Fundamentals of Agribusiness Occupations Achievement Test (FAOAT); (2) compare students' levels of mastery on the Fundamentals of Agribusiness Occupations Achievement Test (FAOAT) according to selected demographic variables; (3) determine which recommended competencies are in fact being taught by teachers; and, (4) determine percentage of time devoted to the six major content areas in the Fundamentals program. The data were collected from 2011 students and 54 teachers of agriculture in 50 schools.

Objective One

1. Students' level of mastery on the 60 item FAOAT was slightly over 57 percent.

2. Students performed best on the FAOAT questions related to agribusiness management (68.1 percent) and plant science (62.3 percent) and the poorest on agricultural mechanics questions (50.6 percent).

Objective Two

1. Over three-fourths of the students completing the FAOAT were in the ninth and tenth grade.

2. Students in twelfth grade scored significantly higher on the FAOAT than eighth and tenth graders. Also, students in grades nine, ten and eleven scored better than eighth graders.

3. Over half of the students (52.5 percent) taking the FAOAT had never been

in an agriculture class before, however, this seemed to have little effect on FAOAT scores.

4. Students taking the FAOAT who were currently members of FFA had significantly higher scores on the test than students who were not in FFA.

5. The 61.9 percent of the students taking the FAOAT who indicated some involvement in supervised occupational experiences had significantly higher scores on the FAOAT than those who had no involvement.

6. College and post high school education bound students scored significantly higher on the FAOAT than students indicating other career plans.

7. Students with plans to enter agricultural occupations, the military or those who had no plans, scored higher on the FAOAT than students who planned to enter a non-agricultural career field.

Objective Three

1. Almost seventy percent (69.7 percent) of the 76 listed Fundamental competencies were taught by 50 percent or more of the teachers responding to the survey.

2. All of the competencies in the leadership content area were taught by 75 percent or more of the teachers.

3. Only two of the sixteen competencies (12.5 percent) in the agricultural mechanics content area were taught by 75 percent or more of the teachers.

Objective Four

1. According to the teachers responding, animal science and plant science topics consumed the largest percentages of the school year. Topics related to agribusiness management used the smallest percentage.

2. A much smaller percentage of time was actually spent in agricultural mechanics instruction than was recommended in state curriculum guidelines.

RECOMMENDATIONS

Based upon the data collected, analyzed and reported herein, the investigators make the following recommendations:

1. In light of the fact that such a small percentage of competencies related to agricultural mechanics are being taught by a majority of the teachers and considering that students performed the poorest on FAOAT questions in this content area, emphasis should be given to strengthening the development of fundamental competencies in agricultural mechanics. Strategies for strengthening this component might include but are not limited to: (1) inservice educational activities to develop the agricultural mechanics skills of teachers; (2) special attention by Department of Education regional consultants for agribusiness during the program review process to note deficiencies related to agricultural mechanics instruction; and (3) increased attention at the pre-service level to emphasize the role and need for instruction in agricultural mechanics at the Fundamentals level in the program of vocational agriculture.

2. Teachers of agriculture who teach Fundamentals of Agribusiness and/or Agribusiness and Natural Resources should encourage all students to be

members of the FFA chapter and to become involved with appropriate supervised occupational experiences. This recommendation is made because of the significantly higher scores obtained by students on the FAOAT who were FFA members and indicated some involvement with supervised occupational experiences.

Recommendations for Further Study

1. Assess students' level of mastery of the 53 competencies that fifty percent or more of the teachers indicated were included in the Fundamentals program.

2. Compare students' performance on the FAOAT administered at the beginning of the school year with performance at the end of the year.

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APPENDIX A

October 14, 1983

Name
School
Street Address
City, State, Zip Code

Dear_____:

We have recently developed and are now in the process of field testing several "tests" to help measure what students have learned in Fundamentals of Agricultural Occupations (3710) and Applied Principles of Agricultural Occupations (3720). This effort is designed to provide information that will be useful in determining instructional material needs, possible curricula modifications, and to measure how well these courses are accomplishing their objectives. The tests are directly related to the competencies that are outlined in the curriculum guides for these two courses.

It is our plan to administer these tests in April-May, 1982, to students from a randomly selected sample of schools in Florida. If you agree to participate and your school is randomly selected, you will be mailed tests in April which are to be administered to either your Applied Principles or Fundamentals classes.

Your classes' test results will be grouped with those from other schools; therefore, neither your classes nor your school will be identified. All information regarding your school will be kept confidential. However, we can provide you with a copy of the results of the tests for your students if you so desire.

If this activity is to be successful, we need your help! Enclosed you will find a one page survey form that we are asking you to complete and return to us. We hope that you will be willing to participate in this study.

Sincerely,

Max B. McGhee
Associate Professor

Jimmy G. Cheek
Associate Professor

MBM/JGC/ldk

APPENDIX B

January 28, 1983

Dear Colleague:

Several weeks ago we wrote you regarding the development of "tests" to measure what students have learned in Fundamentals of Agricultural Occupations (3710) and Applied Principles of Agricultural Occupations (3720). This effort is designed to provide information that will be useful in determining instructional material needs, possible curricula modifications, and to meausre how well these courses are accomplishing their objectives. The tests are directly related to the competencies that are outlined in the curriculum guides for these two courses.

It is our plan to administer these tests in April-May, 1983, to students from a sample of schools in Florida. If you agree to participate, you will be mailed tests which are to be administered to either your Applied Principles or Fundamentals classes. Your classes' test results will be grouped with those from other schools; therefore, neither your classes nor your school will be identified. All information regarding your school will be kept confidential. However, if you desire we can provide you with a copy of the results of the tests for your students; you might want to use it as part of a final exam grade.

From our first letter we have received a strong positive response. However, we would like to broaden our study to include more schools and to do so we need your help. If you would be willing to participate in this study, please complete and return the enclosed form.

Sincerely,

Max B. McGhee
Associate Professor

Jimmy G. Cheek
Associate Professor

MBM:JGC:ldk

NAME_____

SCHOOL ADDRESS_____

_____

SCHOOL PHONE NUMBER_____

1. Are you teaching Fundamentals of Agricultural Occupations (3710) this year? YES NO

2. Are you teaching Applied Principles of Agricultural Occupations (3720) this year? YES NO

3. Would you be willing to administer a test to your students near the end of the school year related to either of the above courses? YES NO

If you answered YES to item 3, please complete the following questions:

A. How many students and classes of Fundamentals and Applied Principles do you have?

	Number of Classes	Number of Students
Fundamentals	_____	_____
Applied Principles	_____	_____

B. In Applied Principles, which of the following areas do you teach in addition to the "core" competencies? The "core" competencies relate to agricultural mechanics, agricultural business management, and leadership. (Check appropriate response).

		Number of Students
Agricultural Production	_____	_____
Agricultural Mechanics	_____	_____
Forestry	_____	_____
Ornamental Horticulture	_____	_____
Agricultural Resources	_____	_____
Agricultural Products	_____	_____
Agricultural Supplies and Services	_____	_____

APPENDIX C

FUNDAMENTAL OF AGRIBUSINESS
OCCUPATIONS ACHIEVEMENT TEST

PLEASE READ INSTRUCTIONS CAREFULLY BEFORE PROCEEDING!!!

1. You have been given a computer answer sheet. On the left hand side you will see a row of boxes for your name. Fill your name in the blanks across the top and then darken the circled letters in the circles below.

2. When you are told to proceed with the examination, please darken the circle for the answer you wish to give. For example, if the answer to question one is A, then darken the circle under A on the answer sheet.

3. Use the pencil supplied to you, and darken only the circle which is for the answer you have chosen. Be careful not to put any other marks on the page and to only darken one circle for each question. It is suggested that you check yourself every few questions to be certain that you are darkening the correct circle for the question you are answering.

PART 1
MULTIPLE CHOICE

Directions: On the answer sheet, completely darken the circle beside the number of the best answer for each question.

1. The breed of beef cattle, imported from Scotland, recognized by long, shaggy hair and long horns is the:

   a. Devon
   b. Galloway
   c. Charolais
   d. Scotch Highlands

2. A breed of cattle that can be used for either beef or milk production is called:

   a. Hybrid
   b. Cross breed
   c. Exotic breed
   d. Dual-purpose breed

3. The dairy breed noted for large size, solid color ranging from light to dark brown is the:

   a. Jersey
   b. Brown Swiss
   c. Ayrshire
   d. Shorthorn

4. The Florida dairy industry produces milk for:

   a. Local consumption
   b. Cheese for export to other states
   c. Butter for export to other states
   d. Milk for Russia

5. The breed of swine that is solid white in color, medium size with erect ears is the:

   a. Yorkshire
   b. Hereford
   c. Duroc
   d. American Landrace

6. A group of baby pigs, born from the same sow, in the same pregnancy is called a:

   a. Farrow
   b. Litter
   c. Tribe
   d. Gaggle

7. Draft horses are bred for:

   a. Racing
   b. Strength
   c. Riding
   d. Sheep herding

8. A male horse used for breeding purposes is called a:

   a. Stallion
   b. Filly
   c. Mare
   d. Gelding

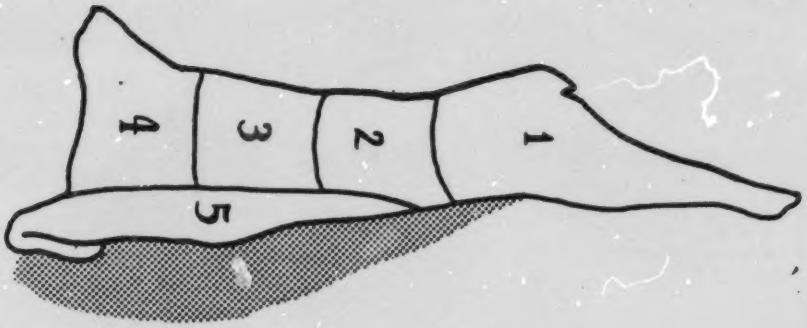
9. A horse whose lineage may include ancestors of many breeds is called a:

   a. Scrub or mixed animal
   b. Quarter horse
   c. Foal
   d. Crossbred

10. The primary use of Plymouth Rock chickens is for:

   a. Eggs
   b. Dual purpose - eggs and meat
   c. Show birds
   d. Cock fighting

11. From the diagram of a lamb carcass, identify the major wholesale cut of lamb indicated at #1.



a. Loin
b. Leg
c. Shoulder
d. Rack

12. The tool illustrated is a:

a. Hand screw
b. Bar clamp
c. "C" Clamp
d. Round File

13. The tool illustrated is a:

a. Try square
b. Combination square
c. Carpenters square
d. "T" Square

14. The tool illustrated is a:

a. Center punch
b. Sheet metal punch
c. Drill bit
d. Nail set punch

15. The tool used to drive a finishing nail beneath the surface or flush with the surface without damaging the wood is the:

a. Solid punch
b. Ball pein hammer
c. Countersink
d. Nail set

16. The oxygen cylinder for oxyacetylene welding is painted what color?

a. Black
b. Green
c. White
d. Red

17. Oil and grease should be kept from coming in contact with oxygen under pressure because:

a. Poisonous gasses may form
b. Could cause a mess in the shop
c. Oil or grease could ignite
d. Grease could block hoses

18. Proper clothing for oxyacetylene welding includes which of the following items?

a. Gloves
b. Goggles
c. Long sleeves
d. All of the above

19. What should be done if a "flashback" occurs?

a. Increase oxygen pressure
b. Increase acetylene pressure
c. Close blowpipe and regulator valves at once
d. Just wait, flame will soon reappear

20. Which picture best represents a neutral flame?

a. #1
b. #2
c. #3
d. None of the above

21. When molten metal from a welding rod is added to a puddle as it progresses across a piece of metal, it is called:

a. Bronze welding
b. Making a bead
c. Padding
d. Brazing

22. For personal safety when arc welding, the welder should:

a. Wear a helmet with visor in place
b. Wear a helmet, but not a visor
c. Lift the visor occasionally to get a good view of the arc
d. Not wear a helmet

23. Which of the following is an advantage of a D.C. portable welder powered with a gasoline engine?

a. Alternating current
b. No moving parts
c. Can be used in the field
d. None of the above

24. How is electrode size determined?

a. Diameter
b. Length
c. Weight
d. None of the above

25. Proper arc length for an A.C. machine as compared to arc length for a D.C. machine is generally:

a. Shorter
b. Longer
c. The same
d. Harder to maintain

26. In checking a small gasoline engine cylinder for wear, check for:

a. Diameter and taper
b. Out of round and taper
c. Diameter, taper and out of round
d. Diameter only

27. Chapter Farmers are entitled to wear emblems of:

a. Gold
b. Silver
c. Bronze

28. What year was the FFA founded?

a. 1917
b. 1928
c. 1936

29. Which of the following officers prepares and reads the minutes of the meetings and attends to the chapter correspondence?

a. Secretary
b. Reporter
c. Sentinel
d. Treasurer

30. Which of the following changes is <u>NOT</u> a method of amending a motion?

a. Adding words
b. Striking out words
c. Keeping the original words
d. Subetituting words

31. The action by which a member may inform the chapter of a mistake in the proceedings is called:

a. Previous question
b. Rising to a point of order
c. Question of privilege
d. Parliamentary inquiry

32. Annuals complete their life cycle within _____ year(s).

a. One
b. Two
c. Three
d. Four

33. The element that increases a plant's vigor and disease resistance in plants is:

a. Phosphorus
b. Potassium
c. Sulphur
d. Nitrogen

34. The first part to usually emerge from the seed coat is the:

a. Primary root
b. Secondary root
c. Simple root
d. Aerial root

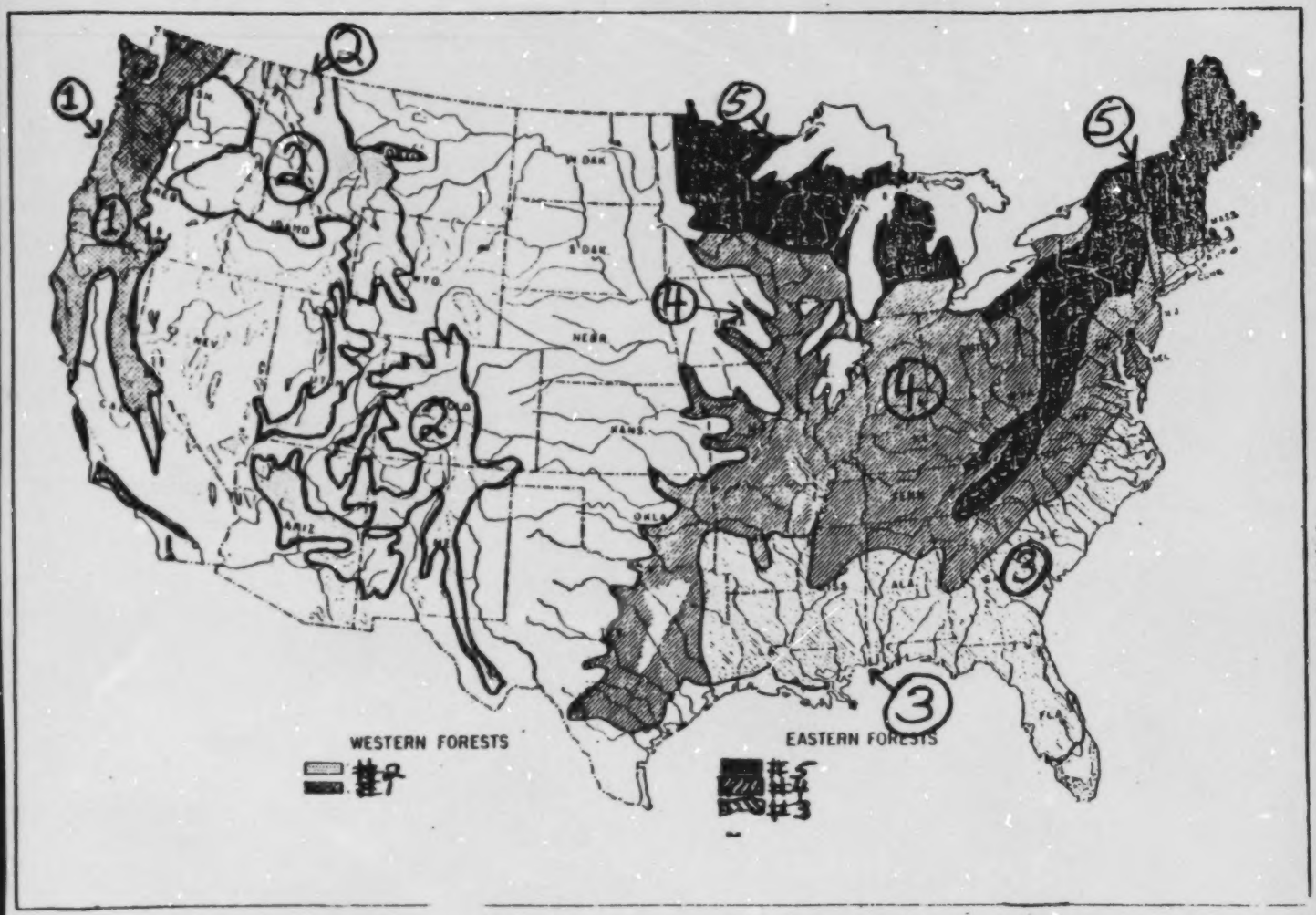
35. In addition to wood products, the forest also provides man with which of the following benefits?

a. Wildlife
b. Recreation
c. Beauty
d. All of the above

36. On the attached map, the Southern Forest is designated by number:

a. #1
b. #2
c. #3
d. #4

Forest Regions of the United States



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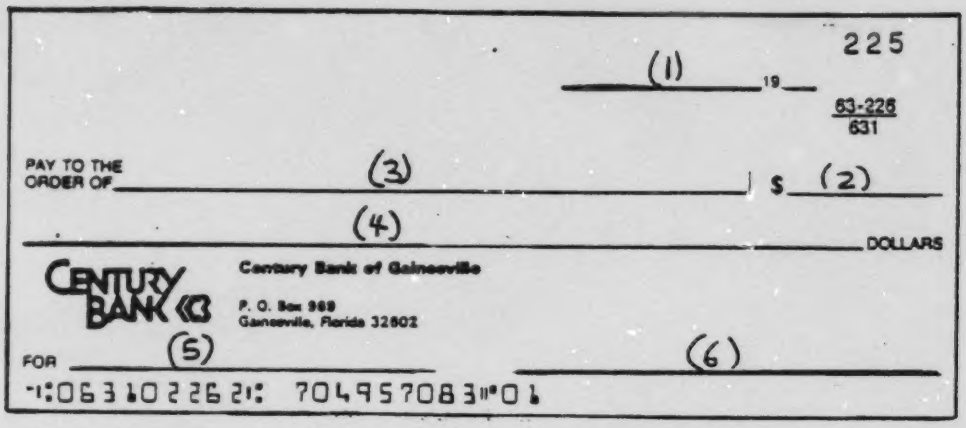
37. Marketing is all business activities involved in the flow of goods and services from the point of initial production until they are in the hands of the:

a. Wholesaler
b. Consumer
c. Retail store processor
d. Food market

Use the "check" below to answer question 38.



38. At what number is the signature put on the check?

a. 1
b. 3
c. 5
d. 6

39. The amount of money that banks charge customers for borrowing money is called:

a. Credit
b. Debt
c. Credit rating
d. Interest

40. A farm business owned and operated by one person is an example of what type of ownership?

a. Corporation
b. Partnership
c. Sole-Proprietor
d. Cooperative

Use the following information to answer questions 41 and 42.

Assets (receipts)

A. Sale of 20 Holstein heifers @ $200/animal
B. Sale of 100,000 lbs. of milk at $10/hundred weight
C. Sale of 30 Angus steers @ $300/animal
D. Custom machine work at $10/hour for 100 hours

Liabilities (expenses)

A. 1,000 gallons of fuel at $1 per gallon
B. 20,000 lbs. of feed at $80 per ton
C. Labor (part-time) $3,000
D. Bought a new hay baler for $5,000

41. How much did the farmer earn by selling his Holstein heifers?

a. $ 400
b. $ 800
c. $4,000
d. $8,000

42. How much did the farmer spend on fuel?

a. $ 500
b. $ 1,000
c. $ 1,100
d. $10,000

43. Fields related to agriculture are often referred to as:

a. Collective farming
b. Cooperative enterprise
c. Agribusiness
d. Organized agriculture

44. Which of the following materials lies beneath the surface soil and has the characteristics of the true nature of the soil?

a. Bedrock
b. Organic
c. Topsoil
d. Subsoil

45. In a particular field the water table is affected by which of the following soil characteristics?

a. Texture
b. Drainage
c. Color
d. Survey

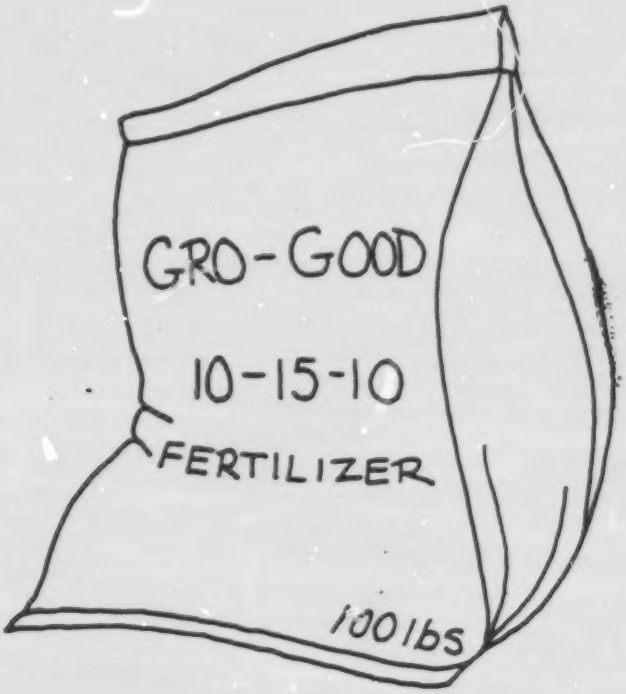
46. The Soil Conservation Service is in the:

a. Department of Agriculture
b. Cooperative Extension Service
c. Department of the Interior
d. United States Forest Service

47. Soil found in Section 2 of the picture below is classified as:

a. Surface soil
b. Bedrock
c. Subsoil
d. Parent material

48. How many pounds of phosphorous are in the bag of fertilizer shown below?



a. 0 lbs.
b. 5 lbs.
c. 10 lbs.
d. 15 lbs.

49. The common land measurement that is equal to 1/640 square mile, is the:

a. Rod
b. Acre
c. Hectare

50. An individual who assists land owners and operators in the application and maintenance of conservation and is usually employed by a governmental agency is a Soil:

a. Conservation Technician
b. Scientist
c. Conservation Aide

PART II
TRUE OR FALSE

Directions: If you believe that the following statements are TRUE, then mark A on the answer sheet. If you believe the statement is FALSE, mark B on the answer sheet.

51. The Smith-Hughes Act encouraged states to promote and develop programs of vocational agriculture.

a. True
b. False

52. A Greenhand Degree must be attained by the member before receiving the Chapter Degree.

a. True
b. False

53. The word "cotyledon" means seed-leaf.

a. True
b. False

54. The primary function for the leaf is photosynthesis.

a. True
b. False

55. Plants absorb water primarily through the root hairs.

a. True

56. Pollination is a function of the male flowers on a plant.

a. True
b. False

57. Insects reduce yields and lower the quality of crop production.

a. True
b. False

58. Insecticides are used to control weeds.

a. True
b. False

59. Rainfall is a source of weathering on soil.

a. True
b. False

60. There are nine micronutrients found in the soil.

a. True
b. False

PART III
OTHER INFORMATION

Directions: Please answer the following questions by darkening the circle which represents your response.

61. What grade are you in now?

a. 8th
b. 9th
c. 10th
d. 11th
e. 12th

62. Have you ever been in an agriculture class before this year?

a. Yes
b. No

63. Are you now a member of your school's FFA Chapter?

a. Yes
b. No

64. Do you have a supervised occupational experience project, such as raising a steer, growing a garden, or working at an agricultural job?

a. Yes
b. No

65. What do you plan to do after graduation from high school?

a. Work in an agricultural occupation
b. Work in a NON-agricultural occupation
c. Go to college (either community/junior or university), or some other type of post high school institution.
d. Enter the military
e. Don't know

Fundamentals of Agribusiness
Occupations Achievement Test

Answer Key

Item	Answer
1	D
2	D
3	B
4	A
5	A
6	B
7	B
8	A
9	A
10	B
11	B
12	B
13	B
14	D
15	D
16	B
17	C
18	D
19	C
20	B
21	B
22	A
23	C
24	A
25	C
26	C
27	B
28	B
29	[illegible]
30	C
31	B
32	A
33	B
34	A
35	D
36	C
37	B
38	D
39	D

Answer Key (continued)

Item	Answer
40	C
41	C
42	B
43	C
44	D
45	B
46	A
47	C
48	D
49	B
50	A
51	A
52	A
53	A
54	A
55	A
56	A
57	A
58	B
59	A
60	B

APPENDIX D

Appendix D

Summary Statistical Data Relative to the Fundamentals of Agribusiness Occupations Achievement Test (FAOAT)

Factor	Statistics
Number of Students Taking Test	2011.00
Total Number of Items on Exam	60.00
Highest Possible Score	60.00
High Score	57.00
Low Score	3.00
Mean Score	34.23
Median Score	35.00
Mode Score	40.00
Standard Deviation	9.79
Standard Error of Measurement	3.46
Kuder Richardson 20 Correlation	0.89

APPENDIX E

Appendix E

Item Analysis of the Fundamentals of Agribusiness Occupations Achievement Test

Item Number	Item Difficulty	Item Discrimination	Point Biserial Correlation
1	0.54	0.34	0.27
2	0.68	0.51	0.43
3	0.54	0.29	0.24
4	0.78	0.38	0.38
5	0.52	0.38	0.30
6	0.72	0.30	0.29
7	0.30	0.51	0.42
8	0.64	0.51	0.42
9	0.31	0.32	0.25
10	0.54	0.33	0.28
11	0.61	0.28	0.24
12	0.74	0.36	0.35
13	0.36	0.33	0.28
14	0.33	0.19	0.18
15	0.44	0.35	0.28
16	0.48	0.43	0.34
17	0.52	0.34	0.28
18	0.82	0.42	0.48
19	0.61	0.35	0.31
20	0.30	0.16	0.16

Appendix E (continued)

Item Number	Item Difficulty	Item Discrimination	Point Biserial Correlation
21	0.38	0.37	0.29
22	0.78	0.45	0.47
23	0.54	0.47	0.38
24	0.41	0.34	0.30
25	0.32	0.10	0.10
26	0.50	0.38	0.29
27	0.37	0.43	0.36
28	0.59	0.42	0.35
29	0.61	0.60	0.49
30	0.49	0.51	0.38
31	0.46	0.28	0.22
32	0.61	0.70	0.56
33	0.29	0.07	0.08
34	0.45	0.45	0.38
35	0.71	0.66	0.58
36	0.63	0.53	0.45
37	0.60	0.57	0.46
38	0.81	0.45	0.51
39	0.67	0.61	0.52
40	0.70	0.57	0.52

Appendix E (Continued)

Item Number	Item Difficulty	Item Discrimination	Point Biserial Correlation
41	0.67	0.58	0.50
42	0.68	0.56	0.50
43	0.57	0.52	0.43
44	0.47	0.46	0.37
45	0.57	0.54	0.43
46	0.51	0.46	0.37
47	0.67	0.54	0.47
48	0.46	0.36	0.31
49	0.55	0.42	0.34
50	0.36	0.31	0.27
51	0.72	0.41	0.39
52	0.73	0.52	0.48
53	0.47	0.36	0.30
54	0.67	0.48	0.43
55	0.73	0.52	0.49
56	0.49	0.30	0.26
57	0.70	0.50	0.45
58	0.68	0.55	0.48
59	0.74	0.52	0.49
60	0.48	0.24	0.22

APPENDIX F

TEACHER QUESTIONNAIRE

FUNDAMENTALS OF AGRIBUSINESS
AND NATURAL RESOURCES OCCUPATIONS PROGRAM

NAME_____ SCHOOL_____

Part 1

According to the curriculum guidelines for the Fundamentals of Agribusiness and Natural Resources occupations program, the major content areas are those listed below:

Content Areas	Percentage of Time Spent
Animal Science	_____
Agricultural Mechanics	_____
Leadership	_____
Plant Science	_____
Agribusiness Management	_____
Soil Science	_____
Miscellaneous	_____
	100%

For each content area above, please indicate the approximate percentage of time that is spent at your school on topics related to the content area.

Part II

Directions: For each of the competencies listed below, please circle YES or NO to indicate if that particular competency is covered in your Fundamentals of Agribusiness Occupations (3710) program.

		YES - This Competency IS Included	NO - This Competency IS NOT Included
Animal Science			
1.	The student will be able to identify the different breeds of beef cattle.....	YES	NO
2.	The student will be able to define the terminology related to the beef industry.....	YES	NO
3.	The student will be able to identify the different breeds dairy cattle.....	YES	NO
4.	The student will be able to define common terminology associated with the dairy industry...	YES	NO
5.	The student will be able to identify the major breeds of swine...	YES	NO
6.	The student will be able to define common terminology related to the swine industry.....	YES	NO
7.	The student will be able to identify the major breeds of sheep...	YES	NO
8.	The student will be able to define terminology associated with the sheep industry.....	YES	NO

		YES - This Competency IS Included	NO - This Competency IS NOT Included
9.	The student will be able to identify the major breeds of horses.....	YES	NO
10.	The student will be able to identify common terminology associated with the horse industry..	YES	NO
11.	The student will be able to compare the different breeding practices.....	YES	NO
12.	The student will be able to identify the major breeds of poultry.....	YES	NO
13.	The student will be able to define terminology associated with the poultry industry.....	YES	NO
14.	The student will be able to identify parts of the female and male reproductive systems.....	YES	NO
15.	The student will be able to describe the use or importance of artificial insemination.....	YES	NO
16.	The student will be able to identify the different types of meat.....	YES	NO
17.	The student will be able to describe meat marketing.....	YES	NO
18.	The student will be able to identify the steps involved in processing a meat-type animal.....	YES	NO
19.	The student will be able to list possible careers in animal science.....	YES	NO

		YES - This Competency IS Included	NO - This Competency IS NOT Included
Agricultural Mechanics			
20.	The student will be able to utilize safety practices in the shop.....	YES	NO
21.	The student will be able to identify basic tools.....	YES	NO
22.	The student will be able to use basic tools and equipment.....	YES	NO
23.	The student will be able to demonstrate how to sharpen common shop tools.....	YES	NO
24.	The student will become familiar with basic oxyacetylene welding equipment.....	YES	NO
25.	The student will be able to turn on an oxyacetylene welder.....	YES	NO
26.	The student will learn how to run a bead and cut.....	YES	NO
27.	The student will learn how to shut off torches.....	YES	NO
28.	The student will become familiar with basic arc welding equipment.....	YES	NO
29.	The student will learn how to run a bead.....	YES	NO
30.	The student will be able to describe maintenance of a farm tractor.....	YES	NO
31.	The student will learn proper operation of a farm tractor.....	YES	NO

		YES - This Competency IS Included	NO - This Competency IS NOT Included
32.	The student will learn to identify major systems of a small gasoline engine.....	YES	NO
33.	The student will be able to describe the basic fundamentals of how a small engine operates.....	YES	NO
34.	The student will be able to describe preventative maintenance of a small gasoline engine.....	YES	NO
35.	The student will be able to identify tools used to service small engines.....	YES	NO

Leadership

36.	The student will be able to determine what the FFA represents....	YES	NO
37.	The student will be able to explain the history of the FFA.....	YES	NO
38.	The student will be able to understand the different degrees of membership.....	YES	NO
39.	The student will be able to determine types of programs offered by the FFA.....	YES	NO
40.	The student will learn elementary parliamentary procedure practices....	YES	NO

		YES - This Competency IS Included	NO - This Competency IS NOT Included
Plant Science			
41.	The student will be able to classify plants botanically.....	YES	NO
42.	The student will be able to identify plants by their life cycles.	YES	NO
43.	The student will be able to identify plants by their use.....	YES	NO
44.	The student will be able to determine the form and basic structure of a plant.....	YES	NO
45.	The student will be able to determine the parts of a plant.....	YES	NO
46.	The student will be able to identify and describe growth regulators.....	YES	NO
47.	The student will be able to identify plant nutrients.....	YES	NO
48.	The student will be able to describe plant reproduction.....	YES	NO
49.	The student will be able to describe the germination of a seed...	YES	NO
50.	The student will be able to describe the methods associated with planting and transplanting.....	YES	NO
51.	The student will be able to list and identify major plant pests.....	YES	NO
52.	The student will learn what methods to use to control plant pests.....	YES	NO

		YES - This Competency IS Included	NO - This Competency IS NOT Included
53.	The student will be able to list possible careers in plant science and forestry.....	YES	NO
54.	The student will learn the importance of forestry.....	YES	NO
55.	The student will be able to survey forest area types in the U.S..	YES	NO
56.	The student will become aware of the forest agencies, organizations, and branches.....	YES	NO
57.	The student will be able to recognize 30 common forest trees in Florida.....	YES	NO
58.	The student will be able to identify areas involved in the forestry contest.....	YES	NO

Agribusiness Management

59.	The student will be able to identify an Agribusiness.....	YES	NO
60.	The student will be able to analyze an Agribusiness.....	YES	NO
61.	The student will be able to determine the properties of good money management.....	YES	NO
62.	The student will be able to determine the different types of agribusiness, business structures.	YES	NO
63.	The student will demonstrate the ability to keep accurate business records.....	YES	NO

		YES - This Competency IS Included	NO - This Competency IS NOT Included
64.	The student will develop knowledge of Agribusiness careers....	YES	NO
65.	The student will be able to determine supervised occupational work experiences.....	YES	NO
Soil Science			
66.	The student will be able to describe how soil is formed.....	YES	NO
67.	The student will be able to describe different soil colors.....	YES	NO
68.	The student will be able to identify the components of soil.....	YES	NO
69.	The student will be able to define components of productive soil.	YES	NO
70.	The student will be able to explain the need for conserving natural resources.....	YES	NO
71.	The student will be able to identify agencies involved in conservation of natural resources....	YES	NO
72.	The student will be able to describe soil classification.....	YES	NO
73.	The student will be able to identify methods used in determining soil nutrient deficiencies.....	YES	NO
74.	The student will be able to identify major fertilizer elements...	YES	NO

		YES - This Competency IS Included	NO - This Competency IS NOT Included
75.	The student will be able to develop land and soil records.....		
76.	The student will be able to identify major careers in soil science.....	YES	NO

THANKS SO MUCH FOR YOUR HELP!!!

APPENDIX G

April 12, 1983

M E M O R A N D U M

TO: Selected Teachers of Fundamentals or Agribusiness and Natural Resources Occupations

FROM: Max B. McGhee
Jimmy G. Cheek
Associate Professors, Dept. of Agricultural and Extension Education,
305 Rolfs Hall, University of Florida, Gainesville, Florida 32611

RE: FORTHCOMING PACKAGE

GET READY!! IT'S ABOUT TO HAPPEN!!

In the next few days you will be receiving a package from us which will require your cooperation. This package comes as a result of your favorable response to an earlier mailing which asked if you would be willing to administer a test to your "Fundamentals" class(es). This is the most important phase of the project we are conducting to assess competencies possessed by students completing the Fundamentals program. Your students' participation in this activity will help improve the statewide program of Agribusiness and Natural Resources education. You should also remember that neither you, your school, nor your student's will be identified in any reports of this activity.

To watch your mailbox! Look over the contents closely and PLEASE follow the directions as outlined, and then return the requested items promptly.

Remember - - without your help this activity will not be successful. We are depending on you. Thanks!!

MBM/JGC/ldk

APPENDIX H

April 25, 1983

MEMORANDUM

TO: Selected Teachers of Agriculture

FROM: Max B. McGhee
Jimmy G. Cheek
Associate Professors, Dept. of Agricultural and Extension Education,
305 Rolfs Hall, University of Florida, Gainesville, Florida 32611

RE: Assessment of Competencies in Fundamentals of Agribusiness Occupations Possessed by Students

As you may recall, a few months ago you responded to a request from us indicating that you would be willing to administer a test to students in your Fundamentals class(es).

Well, the time has arrived for us to collect on your generous offer of cooperation!

Enclosed with this mailing are some important materials that must be dealt with properly in order to avoid confusion either here at our office or in your program. The following materials should be included:

1. A sufficient number of copies of student tests for your largest class of Fundamentals of Agribusiness Occupations. After the tests are administered you should feel free to keep them.

2. Sufficient answer sheets for all of the students you indicated were enrolled in Fundamentals of Agricultural Occupations. Also included are self-addressed stamped envelopes for returning the answer sheets and teacher questionnaire to our office.

3. A questionnaire entitled "Teacher Questionnaire - Fundamentals of Agribusiness and Natural Resources Occupation Program". You can complete this questionnaire while your students are taking the test.

4. A sheet entitled Instruction to the Teacher. These are the specific activities you will need to follow in order to properly administer and return the completed answer sheets to our office.

If any of the above materials are NOT enclosed, please call us at (904) 392-0502 and we will send them to you.

Because of our tight time schedule for completion of the project, you should administer the tests such that you can return the answer sheets no later than May 15, 1983. If you return your students answer sheets no later than this date, we will have them scored and be able to return each student's raw score to you. You may wish to use this score as one measure of the students mastery of the competencies in your program.

In summary, we appreciate your willingness to assist us in this important effort. Please feel free to contact us if you have any questions or concerns.

MBM/JGC/ldk

Enclosures

APPENDIX I

M E M O R A N D U M

TO: Teachers assisting with the Fundamentals of Agribusiness Occupations Assessment Project

FROM: Max B. McGhee
Jimmy G. Cheek
Associate Professors, Dept. of Agricultural and Extension Education, 305 Rolfs Hall, University of Florida, Gainesville, Florida 32611

RE: Return of Answer Sheets

Time is growing short in the school year and in reviewing our records we noticed that your answer sheets and teacher questionnaires have not yet arrived in our office. It is very important that we receive responses from all schools/teachers who have agreed to assist us in this activity. If you have not already done so, please administer the tests and return the answer sheets and teacher questionnaire as soon as possible.

If you have encountered some difficulties or have questions, please feel free to contact us at (904) 392-0502.

Again, we appreciate your interest in assisting us in this effort.

MBM/JGC/ldk

P.S. If you have already mailed the requested materials, thanks for your promptness.

APPENDIX J

MEMORANDUM

TO: Teachers assisting with the Fundamentals of Agribusiness Occupations Assessment Project

FROM: Max B. McGhee
Jimmy G. Cheek
Associate Professors, Dept. of Agricultural and Extension Education, 305 Rolfs Hall, University of Florida, Gainesville, Florida 32611

RE: Final Comments

Let us begin by expressing our appreciation for your prompt return of the answer sheets and teacher questionnaires which were necessary to complete the data collection phase of our project. Your assistance and cooperation certainly has made our task more enjoyable.

Enclosed with this memo are the raw scores for the Fundamentals of Agricultural Occupations tests completed by your students. We will have some summary statistics for all students completing the tests at a later date with which you might compare your students' level of mastery.

Again, let us say thanks for your time and cooperation. If we can be of assistance to you in any way in the future, please feel free to contact us.

MBM/JGC/ldk

Enclosure

APPENDIX K

Number and Percentage of Respondents
Teaching Competencies Identified
in State Curriculum Guides

n = 54

CONTENT AREA	NUMBER	PERCENT
Animal Science		
1. The student will be able to identify the different breeds of beef cattle.....	49	90.7
2. The student will be able to define the terminology related to the beef industry.....	46	86.8
3. The student will be able to identify the different breeds of dairy cattle.....	41	75.9
4. The student will be able to define common terminology associated with the dairy industry...	40	75.5
5. The student will be able to identify the major breeds of swine...	46	85.2
6. The student will be able to define common terminology related to the swine industry.....	45	83.3
7. The student will be able to identify the major breeds of sheep...	7	12.9
8. The student will be able to define terminology associated with the sheep industry.....	8	14.8
9. The student will be able to identify the major breeds of horses.....	18	34.6
10. The student will be able to identify common terminology associated with the horse industry..	21	40.4

	CONTENT AREA	NUMBER	PERCENT
11.	The student will be able to compare the different breeding practices.....	29	55.8
12.	The student will be able to identify the major breeds of poultry.....	27	51.9
13.	The student will be able to define terminology associated with the poultry industry.....	31	60.8
14.	The student will be able to identify parts of the female and male reproductive systems.....	30	57.7
15.	The student will be able to describe the use or importance of artificial insemination.....	34	65.4
16.	The student will be able to identify the different types of meat.....	27	51.9
17.	The student will be able to describe meat marketing.....	21	40.4
18.	The student will be able to identify the steps involved in processing a meat-type animal.....	22	42.3
19.	The student will be able to list possible careers in animal science.....	46	88.5
	Agricultural Mechanics		
20.	The student will be able to utilize safety practices in the shop.....	47	87.0
21.	The student will be able to identify basic tools.....	45	83.3
22.	The student will be able to use basic tools and equipment.....	28	71.8

	CONTENT AREA	NUMBER	PERCENT
23.	The student will be able to demonstrate how to sharpen common shop tools.....	23	42.6
24.	The student will become familiar with basic oxyacetylene welding equipment.....	22	40.7
25.	The student will be able to turn on an oxyacetylene welder.....	20	37.0
26.	The student will learn how to run a bead and cut.....	17	31.5
27.	The student will learn how to shut off torches.....	20	37.0
28.	The student will become familiar with basic arc welding equipment.....	26	48.1
29.	The student will learn how to run a bead.....	25	46.3
30.	The student will be able to describe maintenance of a farm tractor.....	34	63.0
31.	The student will learn proper operation of a farm tractor.....	39	72.2
32.	The student will learn to identify major systems of a small gasoline engine.....	21	38.9
33.	The student will be able to describe the basic fundamentals of how a small engine operates.....	22	40.7
34.	The student will be able to describe preventative maintenance of small gasoline engine.....	24	44.4
35.	The student will be able to identify tools used to service small engines.....	21	38.9

CONTENT AREA	NUMBER	PERCENT
Leadership		
36. The student will be able to determine what the FFA represents....	52	96.3
37. The student will be able to explain the history of the FFA.....	52	96.3
38. The student will be able to understand the different degrees of membership.....	52	96.3
39. The student will be able to determine types of programs offered by the FFA.....	51	94.4
40. The student will learn elementary parliamentary procedure practices....	50	92.6
Plant Science		
41. The student will be able to classify plants botanically.....	37	68.5
42. The student will be able to identify plants by their life cycles.	49	90.7
43. The student will be able to identify plants by their use.....	47	87.0
44. The student will be able to determine the form and basic structure of a plant.....	49	90.7
45. The student will be able to determine the parts of a plant.....	51	94.4
46. The student will be able to identify and describe growth regulators.....	24	44.4
47. The student will be able to identify plant nutrients.....	49	90.7
48. The student will be able to describe plant reproduction.....	47	87.0

	CONTENT AREA	NUMBER	PERCENT
49.	The student will be able to describe the germination of a seed...	47	87.0
50.	The student will be able to describe the methods associated with planting and transplanting.....	49	90.7
51.	The student will be able to list and identify major plant pests.....	37	69.8
52.	The student will learn what methods to use to control plant pests.....	40	74.1
53.	The student will be able to list possible careers in plant science and forestry.....	52	96.3
54.	The student will learn the importance of forestry.....	46	85.2
55.	The student will be able to survey forest area types in the U.S..	24	44.4
56.	The student will become aware of the forest agencies, organizations, and branches.....	31	58.5
57.	The student will be able to recognize 30 common forest trees in Florida.....	20	37.7
58.	The student will be able to identify areas involved in the forestry contest.....	40	74.1
	Agribusiness Management		
59.	The student will be able to identify an Agribusiness.....	48	90.7
60.	The student will be able to analyze an Agribusiness.....	23	44.2
61.	The student will be able to determine the properties of good money management.....	31	57.4

	CONTENT AREA	NUMBER	PERCENT
62.	The student will be able to determine the different types of agribusiness business structures..	22	42.3
63.	The student will demonstrate the ability to keep accurate business records.....	44	81.5
64.	The student will develop knowledge of Agribusiness careers....	49	90.7
65.	The student will be able to determine supervised occupational work experiences.....	48	88.9
Soil Science			
66.	The student will be able to describe how soil is formed.....	44	81.5
67.	The student will be able to describe different soil colors.....	43	79.6
68.	The student will be able to identify the components of soil.....	44	83.0
69.	The student will be able to define components of productive soil.	43	79.6
70.	The student will be able to explain the need for conserving natural resources.....	45	83.3
71.	The student will be able to identify agencies involved in conservation of natural resources....	34	63.0
72.	The student will be able to describe soil classification.....	40	74.1
73.	The student will be able to identify methods used in determining soil nutrient deficiencies.....	37	71.2
74.	The student will be able to identify major fertilizer elements...	50	32.6

	CONTENT AREA	NUMBER	PERCENT
75.	The student will be able to develop land and soil records.....	11	20.8
76.	The student will be able to identify major careers in soil science.....	39	72.2